IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No:	10/586,173
Appellants:	Hirotaka KAWABATA et al.
Filed:	July 17, 2006
Title:	REFRIGERANT COMPRESSOR
T.C./A.U.:	3746
Examiner:	Christopher S. Bobish
Confirmation No.:	2828
Docket No.:	MAT-8856US

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF-PATENTS
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

S I R :

Appellants hereby request consideration and reversal of the Final Rejection dated October 4, 2011, of claims 1 and 3-9.

This Brief is presented in the format required by 37 C.F.R. § 41.37, in order to facilitate review by the Board. In compliance with 37 C.F.R. § 41.37(a)(1), this Brief is being filed within the time allowed for response to the action from which the Appeal was taken or within two months from the date of the Notice of Appeal, whichever is later.

The fees for filing a Brief in support of an Appeal under 37 C.F.R. § 41.20(b)(2), together with any extension fee required in connection with the filing of this Brief, are provided herewith.

I. REAL PARTY IN INTEREST

The real Party In Interest in this matter is Panasonic Corporation by virtue of an assignment recorded on July 28, 2008, at Reel/Frame 021297/0901.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences related to the subject matter of this Appeal.

III. STATUS OF CLAIMS

Claims 1 and 3-9 have been rejected. Claims 2 and 10-16 have been cancelled.

IV. STATUS OF AMENDMENTS

Appellants submitted an Amendment on August 4, 2011, in which certain amendments to the specification were made. This Amendment was entered and considered by the Examiner, as indicated in the Final Office Action mailed October 4, 2011.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Of the claims on appeal, claim 1 is the only independent claim. Claim 1 is directed to a refrigerant compressor [page 1, line 6; Figure 1]. The refrigerant compressor comprises a hermetic container [page 3, line 20; Figure 1, Item 101] which internally stores [page 3, line 20] a blended oil formed of a plurality of component oils [page 11, line 22, through Table 1]. The hermetic container also accommodates a compression mechanism for compressing refrigerant gas [page 3, lines 20-21; Figure 1, Item 107].

The blended oil ranges from a viscosity grade not lower than ISO VG3 to a viscosity grade not higher than ISO VG8 [page 3, lines 22-23]. The plurality of component oils includes a first component oil which includes a first characteristic having a boiling point at 350°C or over which is not less than 10% and not higher than 30% in volume ratio [page 5, lines 24-25]. The plurality of component oils also includes a second component oil which includes a characteristic having a boiling point at 300°C or less which is not less than 50% and not higher than 70% in volume ratio [page 5, line 25 to page 6, line 1].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 3 and 5 are unpatentable under 35 U.S.C. 103(a) over Kwon et al. (U.S. Pat. No. 7,404,701) in view of Ponsford et al. (U.S. Pat. No. 5,799,626) and Kim et al. (U.S. Pat. No. 4,101,414).

All other claims stand or fall with claim 1.

VII. ARGUMENT

The reasons this application is on appeal are twofold:

1) The obviousness rejection is in error because the references are not properly combinable.

Each reference discloses one of the oil components recited in Applicants' claims. The references, however, pertain to quite different types of oils. One of ordinary skill in the art would not combine the references to obtain Applicants' claimed invention.

2) The obviousness rejection is in error because it does not properly consider the unexpected and surprising results.

Applicants have supplied results showing unexpected reduction in sludge deposition which is achieved when Applicants' claimed blended oil is utilized in a refrigerant compressor. Applicants' surprising results have not been properly considered.

Appellants appeal the rejection of claims 1, 3 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Kwon et al. US 7,404,701 ("the Kwon reference") in view of Ponsford et al. US 5,799,626 ("the Ponsford reference") and Kim et al. US 4,101,414 ("the Kim reference"). Reversal of the rejection is respectfully requested in view of the following remarks.

Appellants' invention, as recited in claim 1 (the only pending independent claim), is directed to a refrigerant compressor comprising:

> a hermetic container which internally stores a blended oil ...
>
> wherein the blended oil ranges from a viscosity grade not lower than ISO VG3 to a viscosity grade not higher than ISO VG8, and
>
> a first component oil includes a first characteristic having a boiling point at 350°C or over which is not less than 10% and not higher than 30% in volume ratio, and a second component oil includes a characteristic having a boiling point at 300°C or less which is not less than 50% and not higher than 70% in volume ratio.

This means that the blended oil has a viscosity grade not lower than ISO VG3 and not higher than ISO VG8. The blended oil is formed from a plurality of component oils. A first of the component oils has a boiling point at 350° C or over and comprises not less than 10% and not higher than 30% of the volume of the blended oil. A second of the component oils has a boiling point at 300° C or less and comprises not less than 50% and not higher than 70% of the volume of the blended oil.

One of the advantages realized by the claimed invention is a reduction in the amount of sludge which otherwise tends to be generated during operation of a refrigerant compressor using an oil as a lubricant. In particular, organic materials such as polyethylene terephthalate (PET) which are used as materials for certain components of the compressor (e.g., the stator) typically dissolve in such oils during operation of the compressor. The organic material residue which is

dissolved deposits on certain surfaces of the compressor, interfering with its efficient operation. Appellants have unexpectedly discovered that using the particular type of blended oil recited in claim 1 helps to reduce the extent of such deposition. Appellants note that none of the cited references addresses the problem of organic material (e.g., PET) residue deposition. An ordinarily skilled person seeking to alleviate this problem thus would not have received any guidance whatsoever from the references.

The Examiner has acknowledged that the Kwon reference fails to teach a blended oil. Appellants respectfully submit that the Ponsford and Kim references fail to cure the deficiencies of Kwon with respect to claim 1.

As best understood by Appellants, the Examiner's conclusions regarding the obviousness of combining and modifying the teachings of the Kwon and Ponsford references to arrive at Appellants' claimed invention appear to be based on the following findings:

1) The Ponsford reference teaches that "any ratio can be chosen" to provide a blended oil.

2) The Ponsford reference does not disclose the viscosity of the blended oil; rather, the reference "compares" the oil which is obtained with "diesel oil" and states that it is "roughly similar" in viscosity to light oil.

3) The viscosity of diesel oil (or light oil) can be between V3 and V8.

4) Accordingly, the blended oil of the Ponsford reference would also have a viscosity between V3 and V8.

Appellants respectfully submit that this reasoning, and thus the conclusion of obviousness drawn therefrom, is flawed.

Firstly, the oil employed in the Ponsford reference is a so-called "styrene oil" and thus is a very special oil, as compared with conventional mineral oil. As shown in Figure 1 of the Ponsford reference, the styrene oil contains a mixture of styrene

dimer and styrene trimer (column 5, lines 51-54). Thus, a "natural styrene oil" and a synthetic styrene oil can be mixed in any ratio, since they have very similar chemical compositions. The results obtained from such a mixture of styrene oils cannot be generalized to mineral oils in general. In other words, even if the oils of the Ponsford reference can be mixed in any ratio, this cannot be extrapolated to apply to oils in general.

Secondly, with respect to point 2) above, while it is true that the Ponsford reference compares the oil which is obtained with diesel oil, only the "appearance" is compared (column 5, lines 24-26). The viscosities of the oils are never directly and quantitatively compared. Therefore, even if diesel oil has a viscosity between V3 and V8, this does not mean that the blended oil of the Ponsford reference necessarily also has a viscosity of V3 to V8.

As previously mentioned, Appellants have unexpectedly discovered that when a blended oil meeting the particular characteristics set forth in the claims is employed as a lubricant in a refrigerant compressor, certain advantages are realized. With this particular oil, "it is possible to prevent PET (polyethylene terephthalate) or the like extracted in the lubricant due to evaporation of the lubricant at the discharge reed or the like from being deposited on the surface of the discharge reed or the like." See the original application at page 6, lines 2-4. An ordinarily skilled person would not have found it obvious, from the disclosures of the cited references, that selecting and controlling the components and component properties of the oil in the manner recited in the claims would likely provide such benefits.

In response to this argument by Appellants, the Examiner (in the Final Office Action) relies on the Kwon reference and argues that such selection would have been "routine" (and thus obvious):

> The Kwon reference further teaches that reducing sludge caused by the high temperature interaction between organic material metals and the lubricant is a known motivation in the compressor art, and further lists viscosity as a critical factor (C. 2 Lines 15-34). One of ordinary skill would find it routine

to choose viscosity and temperature values within optimal ranges to reduce the formation of sludge.

Appellants respectfully submit that this argument is factually and/or legally deficient.

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

The particular section of the Kwon reference cited by the Examiner (column 2, lines 15-34) is very general and simply lists a number of characteristics of a lubricant that may possibly influence the generation of carbon sludge. It does not refer to a direct relationship between the viscosity of the oil and the generation of sludge. In addition, the Kwon reference does not contain any disclosure regarding a possible relationship between the amount of the oil that has a boiling point of 350°C or higher and sludge generation, or between the amount of oil that has a boiling point of 300°C or less and sludge generation. The boiling point characteristics of the oil are not mentioned at all in the Kwon reference. The Kwon reference does not teach or suggest that the boiling point profile of an oil might possibly affect the tendency of the oil to generate sludge. A skilled person therefore could not have had any reasonable expectation, based on the Kwon reference, that varying the boiling point properties of an oil would result in improvements in sludge generation.

The experimental data in Table 1 on page 12 of the present application confirms the importance of at least 10% of the oil having a boiling point of 350°C or greater. The first oil listed in the Table contained only 5% of a component with a boiling point of 350°C or greater and resulted in sludge generation. In contrast, no sludge generation was observed when the other oils listed in Table 1 (containing 12 or 20% of a component boiling at 350°C or greater) were used. These data demonstrate the criticality of the boiling point properties of the oil.

Appellants further note that the sludge being referred to by the Kwon reference is the "carbon sludge" that is generated by thermal decomposition of the lubricant. In contrast, the sludge generation problem which is addressed by Appellants' invention is the result of the deposition of oligomeric polyethylene terephthalate (PET) that is extracted from the electric motor or other components of the refrigerant compressor into the lubricant. The disclosure of the Kwon reference thus would not be considered by an ordinarily skilled person to be relevant to the different type of sludge issue addressed by Appellants' invention.

In the Amendment submitted August 4, 2011, Appellants pointed out the following deficiencies of the Ponsford reference:

> [T]he oil employed in the Ponsford reference is a so-called "styrene oil" and thus is a very special oil, as compared with conventional mineral oil. As shown in Figure 1 of the Ponsford reference, the styrene oil contains a mixture of styrene dimer and styrene trimer (column 5, lines 51-54). Thus, a "natural styrene oil" and a synthetic styrene oil can be mixed in any ratio, since they have very similar chemical compositions. The results obtained from such a mixture of styrene oils cannot be generalized to mineral oils in general. In other words, even if the oils of the Ponsford reference can be mixed in any ratio, this cannot be extrapolated to apply to oils in general.

In the Final Office Action, the Examiner responded to this point as follows:

> Applicants argue that the oil taught by Ponsford is a special oil and cannot be extrapolated to apply to other oils. However, even if this is true, it does not preclude the oil taught by Ponsford from being used as a compressor lubricant in place of, or in combination with other oils. The rejection as presented does not require the characteristics of the oil to be extrapolated onto other oils in the art.

The Examiner's analysis is factually deficient. Organic chemicals, including oils in general, can have almost infinite kinds of chemical structures. The chemical and physical characteristics of organic chemicals such as oils thus vary quite significantly, depending upon their chemical structure. Therefore, the extrapolation of the features of one chemical to another chemical is not possible. In the case of the present application, the chemical and physical characteristics of a mineral oil having a linear chain structure are completely different from those of a styrene oil, which includes an aromatic ring structure, of the type taught in the Ponsford

reference. Generally speaking, aromatic oils have high viscosities in comparison with mineral oils and thus are not preferred for use in the presently claimed invention. Moreover, the oil described in the Ponsford reference is not used for lubrication purposes, but rather as a high temperature heat transfer medium. As such, according to the Ponsford reference (column 9, lines 50-55), the styrene oil should have high thermal stability, low moisture inclusion, low rust generation when in contact with iron pipes, and, finally, good miscibility with conventional heat transfer oil. However, good miscibility with aromatic oils does not mean good miscibility with mineral oils.

In their Amendment dated August 4, 2011, Appellants also pointed out the following additional deficiencies of the Ponsford reference:

> [W]hile it is true that the Ponsford reference compares the oil which is obtained with diesel oil, only the "appearance" is compared (column 5, lines 24-26). The viscosities of the oils are never directly and quantitatively compared. Therefore, even if diesel oil has a viscosity between V3 and V8, this does not mean that the blended oil of the Ponsford reference necessarily also has a viscosity of V3 to V8.

In the Final Office Action, the Examiner responded to this point as follows:

> However, C5, Lines 24-30 of Ponsford also discloses that the viscosity is similar to light oils (i.e. diesel oil) and the Kim reference provided with the rejection teaches diesel oil having a viscosity within the claimed range.

This analysis is factually deficient. The Ponsford reference discloses, at column 5, lines 28-29, that "It [the styrene oil] is roughly similar to light oils in viscosity and boiling points." This passage must be interpreted and understood in the context of the previous passage in the Ponsford reference that states: "and physically resembles diesel oil in appearance." Thus, the reference only discloses that the viscosity of the oil resembles the viscosity of diesel oil "in appearance." The Ponsford reference therefore fails to teach the actual viscosity of the oil. Appellants' claims recite and define specific viscosity values. The Ponsford reference fails to teach or suggest these values; rather, it vaguely characterizes the viscosity using the expression "roughly similar to." A person ordinarily skilled in

the art could not differentiate between an oil with a viscosity value of ISO VG8 and an oil with a viscosity value of ISO VG9 based on "appearance" alone. Such person therefore would not, for example, have found it obvious from the Ponsford reference to select a blended oil having a viscosity grade not higher than ISO VG8, as recited in Appellants' claim 1.

Accordingly, for the reasons set forth above, claim 1 is allowable over the cited prior art. Therefore, reversal of the rejection and allowance of claim 1 are respectfully requested.

The remaining claims include all of the features of claim 1, from which they depend. Thus, the remaining claims are also allowable over the cited prior art for at least the reasons set forth above with respect to claim 1. Therefore, reversal of the rejection and allowance of all the pending claims are respectfully requested.

In view of the arguments set forth above, reversal of the rejection of the claims of the above-identified application is respectfully requested.

Respectfully Submitted,

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Enclosures: Pending claims
Evidence Appendix
Related Proceedings Index

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APPENDIX OF CLAIMS

1. A refrigerant compressor, comprising:

a hermetic container which internally stores a blended oil formed of a plurality of component oils and also accommodates a compression mechanism for compressing refrigerant gas,

wherein the blended oil ranges from a viscosity grade not lower than ISO VG3 to a viscosity grade not higher than ISO VG8, and

a first component oil includes a first characteristic having a boiling point at 350°C or over which is not less than 10% and not higher than 30% in volume ratio, and a second component oil includes a characteristic having a boiling point at 300°C or less which is not less than 50% and not higher than 70% in volume ratio.

2. (Cancelled)

3. The refrigerant compressor of claim 1,

wherein the refrigerant is one of R600a and a mixture whose main component is R600a, and

the blended oil is one of mineral oil and synthetic oil.

4. The refrigerant compressor of claim 1,

wherein phosphorous extreme-pressure additive is added to the blended oil.

5. The refrigerant compressor of claim 1,

wherein the compression mechanism is a reciprocating compression mechanism.

6. The refrigerant compressor of claim 1,

further comprising an electric motor for driving the compression mechanism,

wherein a low-oligomer type insulating material is used as an insulating material for the electric motor.

7. The refrigerant compressor of claim 6,

wherein a component oil of the plurality of component oils is about equal in evaporation temperature to an evaporation temperature of the blended oil.

8. The refrigerant compressor of claim 6,

wherein the electric motor is a distributed-winding motor.

9. The refrigerant compressor of claim 6,

wherein the electric motor is a concentrated-winding motor.

10. - 16. (Cancelled)

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS INDEX

None.